American Electro-platers' Society

(An Educational Society)

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MONTHLY REVIEW

JANUARY, 1915

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I shall pass through this world but once. Any good thing, therefore, that I can do, or any kindness that I can show to any human being, let me do it now. Let me neither defer nor neglect it, for I shall not pass this way again.—Amiel.

JAN 26 1915

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MONTLHY REVIEW

American Electro-platers' Society

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Vol. 1 JANUARY, 1915 No. 8

Editorial

CRITICIZING THE CRITIC

The ideal of the American Electro-platers' Society is to further the interests and knowledge of the membership as a whole.

To achieve this end, let us work along the lines that tend to standardize solutions and methods as far as possible. This will be no easy task, as the conditions under which different operators are obliged to work will cause a variance in methods and formulae. For when "A" has worked out the method that produces the maximum output at the minimum cost in his individual conditions, another operator, called "B," with a superior outfit, finds it inadvisable to use certain parts of "A's" methods, and he may be right from his standpoint.

The further we delve into the mystery of chemical dissociation, the more we realize that the time for us to criticize one another has not yet arrived.

The fact that "A" finds a one percent pickle the best strength to use does not prove that "B" cannot get the best results from a ten percent pickle of some other acid.

In the early days of nickel plating it was thought that nickel could not be successfully deposited from a solution that was not practically pure and neutral double sulphate or double chloride of nickel and ammonia. It was then considered essential to have the solution free from potash, lime and soda. But later we found that boracic acid could be added to the solution and a deposit produced that is in some respects superior to that obtained with the old style solution.

Again, sodium chloride may be added to a nickel solution, and some consider that this still further improves the bath.

Now we have what we are pleased to call high power nickel solutions composed largely of single sulphate of nickel with a soluble chloride. But just why they are called "high power" I am at a loss to say, as they certainly do not deposit any more metal per ampere than the old fashioned solution. Yet it is true that they will stand a greater current density per unit of

surface than the old solution and yield a beautiful finish. Oftentimes the deposit is so bright as to need little or no subsequent buffing.

If we could stop here and figure the cost of these high power solutions, all might be well. But there are other factors that will enter into the argument later. It has been found that the wastes are something enormous, especially when a dense nickel solution (alias high power) is used with a view of eliminating the yellow sediment from the bath and thereby improving the character of the deposit.

Recently several samples of this yellow sediment were examined and it was found that a washed and dried sample contained fifty-four percent of nickel in the form of nickel hydroxide, which was being thrown out as slime. Yet, notwithstanding this loss of metal, the results may justify the means.

It is hoped that all members of the Association will study the letter on page 32 of the December Review, by Mr. Geo. B. Hogaboom. You all know that Mr. Hogaboom is a high authority on electro plating subjects, yet he says, "I feel personally that I do not know anything about plating solutions." When we find a man of Mr. Hogaboom's caliber coming out boldly with an admission of this kind, and confessing his inability to comment, then who has that knowledge and that skill necessary for one who would criticize?

Mr. Hogaboom's letter is a masterpiece. It is this kind of copy that the Review needs, not the slapstick variety that we have seen in print elsewhere and which I hope will never be printed in the Review.

As a substitute for the critic, would it not be more to the point for the President to appoint a committee whose duty it would be to name the subject on which at least one member of each branch should write? These papers should not be published till all were in. In this way we would have at least fourteen opinions on a given subject. We could compare the papers with our own ideas and practices and get much good from the pages of the Review without causing heartache in the breast of some member who, out of pure goodness of heart, has endeavored to be of some service to the Society by writing on a subject with which he is more or less familiar. And many times he may be right while his would-be critic is wrong.

We are beginning to broaden out, but I think we have not yet broadened sufficiently to stand the prod of the critic. It is to be hoped that we may grow to the critic.

Much perfectly good fruit is spoiled by being picked too soon. So, too, many good articles may never come to the Society through the author's fear of the critic.

None of us can qualify as the whole crew, as could the elderly naval man in the "Yarn of the Nancy Brig," whose crew, it will be remembered, was ship whecked and later turned cannibal. The

last survivor was heard to sing, after having eaten the cook:

"I am the cook and captain bold
And the mate of the Nancy Brig,
The midship mite, the bos'n tight,
And the crew of the captain's gig."

FRED J. LISCOMB.

TESTING PLATING ROOM CHEMICALS

By Wm. Voss, New York Branch

My experience in the plating business has brought me in contact with many conditions which no doubt some of you have met in your own experience. One of these conditions is the removing of labels or markings from chemicals when brought into the plating room. This is practiced by some platers who, after removing the labels from chemicals, mark them with codes of their own. This condition is very annoying, especially to the plater who lacks the means of determining the unknown. That this condition not only exists in the plating room, but can be found in many supply houses who sell chemicals to the plater and other professions at large, is well known. The simple mixing or compounding of certain chemicals, or varying the proportions of well known formulae, furnishes a good excuse to raise the price under a trade name, thereby making a mystery of the wonderful salts which the plater or purchasing agent falls for. A case of this kind recently came to my notice. Our purchasing agent received a circular letter from a chemical house which was turned over to me for investigation. They claimed they had a material that would replace cyanide of potassium, it being cheaper for brass, copper and silver solutions. As this material was sold under a trade name it was new to me. I suggested getting a sample of a pound or two of these wonderful salts. After some communication, we were informed that only case or carboy lots, and no samples, were to be had. From the tone of the various letters, I concluded that they had barium cyanide for sale. Later developments proved this to be correct.

I believe the foreman plater should know the material he is using or the composition of these rapid plating salts, because if he uses them without this knowledge he falls an easy prey for this class of goods. It was with this end in view that I prepared this paper. I shall endeavor to explain a few tests that can be made by the plater when in doubt of certain chemicals, and shall take those most usually found, and add tests from time to time upon others.

While the number of chemicals used in some branches of the plating business are quite small, in other branches quite a variety may be found.

In examining salts or liquids of unknown nature one should note the physical and chemical properties, such as color, odor,

formation of the crystals, whether salts are deliquescent or effloresecent, as these conditions offer short cuts to the solving of the unknown. For example, potassium salts usually absorb moisture when exposed to the air and become liquid or semi-liquid. These salts are known as deliquescent salts, while the sodium salts give up moisture and lose their water of crystallization and are known as effloresecent salts. But these conditions do not always indicate potassium or sodium and must not be taken for granted. They should be tested for by other means, for calcium chloride is a deliquescent salt and contains no potassium. There are other salts of like nature. In smelling of various chemical liquids and salts, care should be exercised, as carelessness may lead to serious results, as in the case in a finely divided state, they may be inhaled and find their way into the stomach. In smelling of liquids, smell the stopper, for it is not good policy to put your nose to a bottle and find it contains 26 degrees ammonia or some pungent acid.

Tests for the acids found in the plating room which usually consist of nitric (HNO_3), sulphuric (H_2SO_4), hydrochloric (HCl), acetic ($HC_2H_3O_2$). Test for nitric acid (HNO_3). Pour a few c. c. of strong sulphuric acid into a test tube, add an equal volume of solution to be tested, when cool add a concentrated solution of ferrous sulphate ($FeSO_4$) carefully down the side of the tube. A brown ring where the liquids meet indicates HNO_3 or nitrates. The methods of adding the H_2SO_4 and $FeSo_4$ to the material to be treated vary with the operator. Some add the H_2SO_4 last, which is probably a good method.

Test for sulphuric acid (H_2SO_4). To a portion of the solution in a test tube add a solution of barium chloride ($BaCl_2$). A white precipitate insoluble in dilute HCl denotes sulphates.

Test for hydrochloric acid (HCl). To a solution in a test tube, add a few drops of a solution of nitrate of silver ($AgNO_3$). A white precipitate insoluble in nitric acid, but soluble in ammonium hydrate (NH_4OH), indicates HCl or chlorides.

Test for acetic acid ($HC\,H_3O_2$). This acid can usually be recognized by its odor. Test for the same is as follows: To some of the material in a test tube add a few drops of H_2SO_4 and alcohol, and warm. The odor of vinegar or ethyl acetate indicates acetates. Another test is to warm a solution of copper chloride ($CuCl_2$) in sodium chloride (NaCl) and add a small amount of material under examination. A bright green precipitate, which does not change by boiling, indicates acetates, while a gray black deposit indicates formates. While the latter salts do not appear in the platers' chemicals, I mention it to show the method of examination.

Another test for acetates is the formation of a red solution with ferric chloride ($FeCl_3$).

Test for potassium (K). A small amount of the salt is placed on a clean knife blade or platinum foil and brought into

a Bunsen flame. K, if present, will impart a violet color to the flame, but as sodium interferes with the test, a cobalt or blue glass is used to see the color of the flame.

Test for sodium (Na). This test is similar to that of potassium. It imparts a bright yellow color to a Bunsen flame, but cannot be seen through a blue glass. In using flame tests for various salts, considerable experience is necessary to be able to recognize them, as some salts interfere with others, and there are many elements that impart colors to the Bunsen flame, therefore, if some of the physical properties are noted it will help to make the test more accurate.

Test for ammonia (NH_3) or its salts: Ammonia is usually recognized by its odor, its property of turning red litmus blue and the white cloud formed when an acid (principally HCl), stopper is brought in contact with ammonium hydrate or carbonate. It is also recognized by the following test, which is known as Nessler's Test: A reagent is prepared by adding a solution of potassium iodide (KI) to a solution of mercuric chloride ($HgCl_2$) until the precipitate is nearly all dissolved and then adding a solution of potassium hydrate (KOH). Allow this to settle and decant the clear liquid. The above reagent produces a brown precipitate in the presence of ammonium compounds.

A few suggestions on the examination of solids in a test tube or concentrated solution. Add a few drops of strong sulphuric acid (H_2SO_4).

Sudden effervescence indicates carbonates.
Slight effervescence indicates oxalates.
Odor of hydrogen sulphide indicates sulphides.
Odor of vinegar indicates acetates.
Odor of burning matches indicates sulphites.
Violet colored vapor indicates iodides.
Yellow colored vapor indicates bromides.
White cloud with NH_4OH indicates chlorides.

WHAT THE PLATER ACTUALLY NEEDS TO KNOW

By E. S. Thompson, Chicago Branch.

There are articles being written and lectures given on the importance of analysis in the plating room, and platers are confusing their minds with KCN's, KCy's, NaCl's, H_2SO_4's, NiO's and a thousand and one other symbols. Do we need all this? I say "No." We do need to know chemistry, and I want to emphasize that. But while the various salts and chemicals which the plater uses are put on the market under plain English names which designate their combination, the knowledge of chemical symbols and quantitative analysis is not essential to the average plater.

In the case of silver plating establishments where quanti-

ties of work are turned out and having a very expensive metal as the deposit which must be burnished to a high finish, it is a necessity that the plater in charge have a thorough knowledge of chemical analysis, both qualitative and quantitative. But in these shops the conditions of current do not vary. Neither does the class of work for each tank. The amount of metal in solution for each specialty has been predetermined; so has the number of pieces to be plated; so has the quantity of current to be used for each tank. Then it is only necessary that the plater by analyzing his solution at intervals keep it up to the set standard. It is easy for the one who knows **how,** and the how under those conditions is not hard to learn. But, Mr. Silver Plater, did you ever go up against a proposition where there were bronze, brass, copper (both acid and alkaline), nickel (open tank and mechanical), black nickel, green smuts, arsenic, and a hundred other finishes to be gotten out, and you the only one in the works who knew how to do it, and a superintendent would not allow you to pay a price that would secure help who could handle those solutions intelligently when they were once made up? Also generators in the different shops giving various voltages; and an order coming down at 11:30 on Saturday which must be finished by 12 o'clock that day, if you have to heat the tank connections red-hot to do it. Ever work under those conditions, Mr. Analyst? Do you think an analysis under those conditions would do you any good?

We will consider a brass solution which is made up for a good heavy deposit at six volts from the dynamo. The proper amount of sodium cyanide has been added to keep the anodes free from any heavy oxidation. Everything works nicely with a given amount of work being plated in the solution at one batch. The deposit is of a good color, homogeneous and adherent. The plater mentally prides himself on what a good solution he has made up. He finishes the order for that particular class of work and begins on another with deep recesses to be brass plated, and a different surface area to each piece. Then comes an experiment to find where to set the "stat." He tries it on the point where he had set it for the former class of work and finds that the result is unsatisfactory. He increases the current to where the corners of the work begin to assume a granular appearance and turns his switch back. Then he goes to the field rheostat and raises the voltage to seven or seven and a half volts and sets his "stat" back another point, to cut down the ampereage or watts. What is the result? He has raised the voltage above that intended for the content of free cyanide in the solution and the anodes being oxidized by the decomposition of water faster than the free cyanide can dissolve it, the anodes become coated so much that the "stat" must be set up another point to get the proper amount of current through the solution. In this case the anodes do not feed the solution as fast as the metal is withdrawn, and consequently the solution is robbed of

its metal until there is sufficient cyanide set free to dissolve the salt formed on the anode, which is at first an oxide and gradually changes to a cyanide. Or the plater may see the coating on the anodes and introduce more cyanide as a solvent until there is nearly double the content of free cyanide in the solution, as was at first considered normal in a standard solution. What good would an analysis do?

In the case of no more cyanide being added to the solution and the current increased through the day as the resistance increased until the close of the day, then leave the anodes in the solution over night, the free cyanide would perhaps dissolve from the anode enough metal to bring the content back to normal. (I state this with reservations). In the case of adding more cyanide to the solution while working, the effect would be—the cyanides would attack the anodes and dissolve so much metal from them while the solution was at rest that the metal content would gradually increase until serious results would follow the attempt to deposit an adherent correctly colored brass. All there is left for the plater to do in this case is to dip out some of the solution and throw it away, filling the tank with water, adding a little more cyanide. And while he is doing this, along comes Mr. Smart Superintendent and jumps all over the foreman plater for wasting solutions.

Where the cyanide solution is worked continuously every day and plenty of time given in which to produce the work at as low a voltage as possible, and where the plater disregards all advice to build up a solution as some one else has made one in another shop, these conditions are not so apt to arise. Where the advice, "Have the anode surface considerably above the surface to be plated" goes unheeded and the plater makes up his solutions to suit his particular class of work, very little trouble is experienced in maintaining cyanide solutions or any other solutions, provided that the plater has a knowledge of the reactions of his solutions and knows by the possession of such knowledge what is deficient and what is in excess in each solution.

It seems to me, then, that if I am correct in my logic in the above, that an analytic, or more correctly, a quantitative analysis of the solutions under varying conditions is not such a great asset to the plater. What he needs is a knowledge of the reactions of elements combined in the solution and set free by electrolysis.

It is not my purpose to criticize any one. Especially do I desire to leave out sarcasm. We are all working to a common end, and that is knowledge. Some of us are pursuing one course, some another; but while all the experts are taking time to write and give us formulas which we cannot use, except on classes of work similar to that being plated by the author of the formulas, why not just give us the reactions taking place while the execution of plating and finishing is being carried out?

An article by F. J. Liscomb, published in the Review some

time ago, "What is a Conducting Salt?" I believe was the title of it, are the kind that give to us "bushers" the most knowledge. There have been many articles in the Review which possess considerable merit, both from a scientific and practical point of view. In fact, all of them are meritorious, as they show the good fellowship of their authors, and while I personally believe that quantitative analysis would be the best asset the average plater could boast, provided that conditions were always the same, and standard formulas would be an advanced step in solving the platers' troubles, provided standardization were possible. (Which I do not believe.)

Then, too, if we would bring about standard formulas and ideal coditions which every one could follow in as many different shops, the necessity for high salaried, experienced men would be gone. Any graduate of high school who had a swelled head and was able to make a chemical analysis would go into a plating room for twelve or fifteen dollars per week, and the old "con" talk of the future, and keep the solutions in good shape with anybody who could dip a bucket of water out of the tank and stir cyanide until dissolved.

Since standardization is impossible and quantitative analysis is impracticable, let us get down to the study of ssolvents, elements and reactions without the frills. After we—I say we, because I do not know all the reactions which take place in a plating room turning out a large variety of work—have learned the things that we should know first, chemical symbols and analyses will come easy—if we can use them profitably.

I have not made any attempt to explain any reactions while writing this paper, except by way of explaining my point. If anyone wants to criticize, they are welcome to it, and no hard feeling will enter into it on my part. What I have written so far has created no comment, and this is discouraging. I like to have things threshed out. I like for the other fellow to tell me I am wrong and show me where I am wrong. Now, all you platers, who take advantage of an education in chemistry, get your pens in ink and tell us the why of things. Tell us what changes take place in pickles, why a caustic cleanses grease from metals without seriously attacking metals, the reactions of electric cleaners and the formula you use which gives those reactions. The dipping of iron and steel in acid after freeing from grease and why. What are the reactions of a nickel solution while deposition of nickel is taking place, of cyanide solutions, why does a metal deposit form its solution without the aid of an electric current, and what formula do you use in giving your reasons; why does a metal oxidize in certain solutions? Give the reasons for browns, blues, greens and blacks, also the various tints.

In answering a question asked some time ago in the Review as to why a nickel deposit showed pits, the answers were so varied in character when viewed from the point of the layman

that they were confusing, yet the strangest part of it is they are neraly all, if not all, correct. Some gave the reasons of "too much acid in the solution," "too much alkali," "solution too dense," "solution too low in metal content," etc. Now trace every one of these causes down and you arrive at but one result: current too weak to decompose the water rapidly enough to throw off the hydrogen bubble. In every answer given it would be necessary under that condition to decrease the current to prevent "burning" or "curling," except in the condition of too low a metal content when the solution lacked the conductivity to allow current enough to pass through to rapidly decompose the water.

In the matter of cyanide copper streaking while depositing, the answer, when sifted down, is, poor conductivity and increasing the current above normal so that a deposit could be had. This might be caused by lack of cyanide, lack of metal in solution, but never because of too much cyanide or metal content when the content of either is above normal.

AFTER WHICH, WHAT? THE BOOMERANG AND THE ANSWER

By A. E. Shepherd, Detroit Branch

It is quite evident that in the Chicago and Detroit branches the circumstances that have caused the above comments have had a foundation, the reality of which is naturally very much in evidence to the man on the spot, and not so apparent to those who have not been close to such experiences. However, putting aside the pessimistic, flippant, realistic or earnest manner in which they have clothed their ideas, and never forgetting that we will always have short sighted and far sighted, progressive and non-progressive employers and employees, and that we will always be able to match the case of the employer who cuts his payroll but not his costs in the plating department, with one who pays his platers' expenses in the A. E. S. and decreases his costs, and the case of Mr. Emery Glue taking over the plating department without experience or practical knowledge, by another Mr. Cy A. Nogen, who takes over another Mr. Emery Glue's polishing department without experience or practical knowledge, or even a blush.

The fact remains that we have a live topic before us which we will have to solve without destroying the printing presses, the trade journals, the books on electro plating and the A. E. S., or by deciding what will be the ethical way for a representative of a supply house to conduct his sales.

The A. E. S. has found support in all quarters and has had valuable assistance from supply representatives and trade publication, particularly in its organization, which has made it the

successful body it is today, and their continued support is certainly appreciated and desired, and there will be found no branch of this Society that does not recognize it and be grateful. The personal methods of some representatives, of course, do not accord with the other fellow's notion as to what lengths it is legitimate to go to solicit trade. Some of the methods have been the result of selfishness, others of ignorance, carelessness or thoughtlessness, and some wilfully intended to raise the user up by pushing the other fellow down, and for personal aggrandization and sales. No matter what method, these methods often work a positive injustice to the plater, but he has the consolation of knowing that the thing is bound, sometime, to be overdone and defeat its object, and that decency and the square deal will triumph, and association in the A. E. S. will give a better understanding of what is due between man and fellow man.

In conclusion, the American Electro-platers' Society, as a platers' organization, to be successful must remain a platers' organization and have the support of the practical man and not the exploiter. The practical man's grievance is ours.

Our constitution has stood through two conventions and is amply able to take care of the matter at issue. It defines the qualifications necessary for three classes of membership, and the fault has been in looking for growth without qualification.

We have the remedy in our own hands. We must have the practical man's support. We must observe our constitution and by-laws and revise our membership **now,** and see that those, who through haste, expediency or carelessness have been admitted, lose their membership privileges until they are able to properly qualify.

We need no new rules or by-laws on the subject. We antagonize nobody we want. Action now and the question is solved.

OBSERVATIONS ON NICKEL PLATING

By H. J. Ter Doest, Cleveland Branch

In addressing you on nickel plating, there is so much to be said that I can probably only cover a small part of it—the limit of my experience. In speaking of a nickel solution, I will always mean the double salts solution, made by dissolving 12 ozs. of the double salts in 1 gal. of water, which is, to my mind, a solution that can do almost any kind of work and do it well. I do not think there is anything on the market today that can do better work—remember, I said better work. I did not say faster, which might be done, but I doubt that also very much, as a solution of this kind can be worked at 10 amperes per square foot of cathode surface and get very nearly the theoretical 17.0712 grains per ampere hour. This solution should be kept up in the following manner: Place double salts in a bag or basket, hang it on the cathode rod at night, and let the solution take up all

it will. Should the solution refuse to dissolve the double salts that way, and the solution stands less than 6 degrees Beaume in the winter time, or less than 7 degrees in the summer time, it shows that the solution is weak in metal and requires a little single salts, after which it will again dissolve the double salts up to 6 or 7 degrees, summer or winter. By following the above method you will not go very far wrong with this solution, and you will keep about ¼ oz. of nickel in solution for each degree Beaume of concentration, which means 1½ ozs. for a 6 degree solution, and it can do anything that any other solution will. The fact that it does not dissolve double salts when poor in metal is a good barometer by which to keep up the metal content. I would like to say at this time that it is a matter of how you handle your solution as to whether or not you have to use single nickel salts. You will never have to use single salts if you do not crowd your solution too much for the amount of anode surface you have.

I cannot recall having came in contact with any work in over 30 years' experience that I could not do in this solution.

As there have been a number of questions asked in the MONTHLY REVIEW lately regarding nickel plating, I will try, to the best of my ability, to answer some of them. Someone asks if a lead pipe should be insulated when in a nickel tank? Absolutely yes, for if this is not done you will probably lose a lot of current from your dynamo, as the predominating current of one tank will go through the pipe into the next one, or in other words, your current will be playing hookey, one time this way and then that way. If you have only one pipe in your whole plating room it will not matter so much, but it still is a good precaution to insulate it. I was speaking in particular about a three-wire system; not only must it be insulated, but it must not be placed where it will be in the path of the current, because it will be diverted in such a way that the work will plate faster, or even burn where the current leaves the pipe, when the other work is not plating even normal speed.

Question No. 2. What makes a solution cloudy in the evening after being worked all day? Ans. Dirt stirred up from the bottom. Your tank is too shallow for the work you are doing or you have too much slime on the bottom. Your tank should be at least 6 inches deeper than the work you are doing, and then by raising work carefully your solution will not be cloudy. To avoid too much slime, keep up the metal content of the solution. I have seen 4 inches of slime accumulate in the bottom of a tank in one year. I also have, by being careful of my metal content, worked a solution two years and had only one inch of slime on the bottom of my tank, and used twice as much current to do the same work.

Question No. 3. What causes foaming? Ans. Lack of nickel in the solution, which makes it impossible to use any practical current density without foaming. Too high a current

will also cause foaming. I sometimes run a solution on 4½ volts for a considerable time, plating work with parts of zinc, and this causes foaming, but by keeping the metal content right this will be avoided.

Question No. 4. What causes pitting? To be candid, I do not know, but I do believe we are on the wrong track there as we were in the spotting out problem. I believe we need another Schulte here. It has been my experience, that it is not lack of metal content, as pitting is never seen in places where solutions are worked under those conditions, but always when the solution is otherwise in the pink of condition. I have noticed quite a number of times that I had a slight pitting after adding single salts for a day only, the next day it was all right again, and, as I have cured the trouble at different times by adding single salts, and again with sulphate of ammonia, also with boracic acid, I am at a loss to know the reason, but I never could cure a case of pitting by mechanical shaking; it seemed to make it worse, if anything, so I came to the conclusion that it is caused by some particles floating in the solution. When I add single salts I place it in a basket and let it hang over night on the work rod, and when I take out the basket in the morning there is a deposit of small particles on the basket which, on being lifted, float in the solution, wash off, as it were, and causes pitting for that day only, for after resting the next night this all settles and there is no more pitting. I would like to have my fellow platers here this evening watch and see what they can learn about this condition. It seems to be worse when the anode and cathode rods are close together, another reason for thinking it is floating matter.

Question No. 5. What causes a nickel solution to plate dark? Ans. No nickel solution will plate dark that is free from foreign substances. A nickel solution, no matter how low or how high in metal, if it has nothing in it but the chemicals ordinarily used in nickel solutions, such as sulphate of ammonia, chloride of ammonia, boracic acid, salt, etc., will always plate white, whatever else it may do. Improper rinsing of work is the principal cause of dark plating, and it is essential to have a final rinse for all work immediately before it goes into the solution; by this, I mean water that is used for that purpose only, after rinsing the work in other water first, and be sure to upset work that has pockets in it, as there is no surer way of making a nickel solution black than by getting cyanide in it. Another cause is, if zinc is plated and the current is not on when the work is put in the tank, also by dropping zinc articles in the tank, as the free acid in solution will dissolve this metal. Sometimes castings that are pickled too much will plate dark unless the acid is well rinsed out of the iron.

Question No. 6. What makes work burn at the bottom? Ans. Nine out of ten times because the anodes are a great deal longer than the work, consequently, the lower part of anode

makes the current density too great for the lower work. This is also the cause of anodes wearing away at the top first instead of even. Anodes should not be any longer than the work. A low metal content will aggravate this trouble.

Question No. 7. What makes the nickel brittle? Ans. This everlasting hurry of ours. A slow deposit is generally soft, although, if the solution contains too much free sulphuric acid it will plate brittle. A solution should be but slightly acid. If neither ammonia nor sulphuric acid is added to the solution it will remain in about the right condition.

Question No. 8. What effect has the temperature on solutions? Ans. Work will plate about two times as fast with a solution at 80 degrees Fahr. than with one at 40 degrees Fahr. In some places the solution is warmed to accomplish faster and softer deposition.

Question No. 9. Should a nickel solution be filtered? Ans. That depends on the conditions. If a tank is properly equipped, plenty of space below the work and anodes for the dirt to settle, there is no necessity of filtering. Syphon off the solution about once a year and clean out the dirt, but if solution becomes cloudy towards evening it would be well to filter or clean in some way.

Question No. 10. How can you tell when your solution is low in nickel? Ans. By one of several methods of analysis. The one I used is the electro analysis. I take 37.8 c. c. of nickel solution and the same amount of 26% ammonia, which makes the solution a clear blue; place this in a tin can which has been previously weighed, about 2½ inches in diameter, make an iron wire spiral about 1½ inches in diameter, as an anode, place same in position and turn on the current until you have about ½ ampere; it will be colorless in about 3 to 4 hours, showing that all the metal has been deposited. Now pour out solution and carefully weigh the can; the difference in weight is the amount of metal contained in the 37.8 c. c. or 100th part of a gallon. Now multiply by 100 and divide by 437.5 and you have the number of ounces of nickel in one gallon of solution. Another method is to take same appliances, put a small motor on your spiral cathode, turn on 12 volts and your analysis will be completed in 20 minutes. While I have used this method for several years, I find, in making duplicate analysis, it is not always reliable. I have here two cans that were used the latter way, and while duplicate analysis and vary only .01 grains in this case, it varies up to .35 grains sometimes, altogether too much.

I think a method can be found that would be more simple. The cyanide or volumetric method appears to be more simple although I have never tried it. I have in mind a method with a color comparator that I think should be close enough and is very simple. This might be a nice problem for the Standardizing Committee to work out. Another point I would like to make clear is that the standard method should be equally applicable

to all kinds of nickel solutions and with a minimum of appliances.

I would also like to say that the following appeared in the MONTHLY REVIEW: What per cent of iron does a sulphate of ammonia solution deposit? Ans. Eleven per cent. What per cent of iron does a single salt and boracic acid solution deposit? Ans. Three per cent. I take it for granted that the conditions were the same. What I would like to know is, where does the other 8% go in the boracic acid solution? And where do you get the 11% of iron in the sulphate solution? Does the sulphate of ammonia create the iron or does the boracic acid convert the iron into nickel? If not, this thing could not go on indefinitely, as the 8% would soon have the boracic acid solution one of iron.

ON THE SUBJECT OF "SPOTTING OUT"

By Thomas Brown, New York Branch

An article appearing under the caption of "The Spotting Out Problem," by Mr. Louis Schulte, in the November issue of the Brass World, seems to demand something more than a casual perusal, owing to the statements therein which the author sets down as facts.

In the first place, the report of the "investigations" which were carried on is extremely meager and incomplete. We are told that after plating "castings in a brass and bronze solution for one week or one month" ther was no "spotting." The solution was then at rest for a while, etc., "and the next new lot of castings plated in the same solution showed spotting out." Some of these castings (the spotted ones presumably) were set aside for "several months." Part were thereupon replated in the same solution after "several months," and they did not spot. The balance of these castings which had been put aside for several months were again replated and—they spotted.

We will now consider the explanation offered: The author tells us that knowing "that metals of the alkaline earths, potassium, soda and calcium will dissolve in water," that he finally arrived at solutions containing 1lb of potash to 10 gallons of solution. He also admits that the goods "spotted terribly," and that the brass solution was plating white and the bronze was plating green. This rather sad experience led the experimenter to believe "that the spotting out was nothing but an electrodeposition of metals of the alkaline earths and alloys from the containing electrolyte." Now, let us examine this statement, assuming that the nivestigator had a caustic potash solution or a caustic soda solution, which he surely had to quite an extent when he got down to a basis of 1lb to 10 gallons as he admits; I must disagree with him when he states that the alkaline metals deposit. Practically speaking, these compounds which he added, were inert substances, so far as the electrolysis

of his solution was concerned. From an academic point of view it may be that they deposit, but this deposit, if it occurs, is immediately returned to its original source by the action upon water of these metals of the alkaline earths. It is not the cyanogen of the free cyanide which the plater has to contend with as a cause of spotting out. It is the potassium combined with it which causes the trouble. As pointed out in other discussions on this subject, potassium salts are deliquescent and absorb moisture from the air, thus becoming slimy and wet and spreading. This is one of the practical reasons for preferring sodium cyanide to potassium cyanide. Another and a very important reason is the greater amount of cyanogen which can be combined with sodium than with potassium.

In discussing this subject, I will only attempt to answer the main questions involved, as to take up each statement categorically would involve a useless argument on side issues which would be entirely beside the point. It will suffice for me to say, however, that Mr. Schulte has made some statements which are very apt to mislead and confuse, inasmuch as they do not always coincide with generally accepted chemical theories.

Now we come to that part of his experiments where he tells us how to get rid of the carbonate in the solution—in his case it was potassium carbonate. He used a mixture of barium nitrate. A precipitate of barium carbonate was formed and went to the bottom of the tank. But let us see what else happned. The nitrate and the chloride merely exchanged places in certain definite proportions with the carbonate, and he then had as inert matter in his solution potassium nitrate and potassium chloride. And, mind you, these new inert substances were still in solution, and I may add that they are more unstable and troublesome under electrolysis than plain carbonates.

This proceeding had no definite bearing on the question of "spotting out," and was merely a pointless and unintelligent messing of chemicals.

The investigator does not say whether this solution plated after this proceeding, but we may assume that it did, although we might well have some very well-grounded fears for its future good conduct.

I come now to that part of the "investigation" in which the author found that the electric current caused "spotting out." He states that "the low current will allow the deposition of the metals of the alkaline earths much easier than the higher current forming a larger amount of hydrogen by which water is set free," etc. This is enough, however. The electric current breaks up water into its two parts and we get two volumes of hydrogen at the negative pole and one volume of oxygen at the positive pole. Anyone can try this and prove it by collecting the gases in bottles filled with water and inverted over the respective poles. The gases will bubble up into the bottles and they will be in the proportion of two of hydrogen to one of oxygen.

However, water is set free in the solution by the decomposition of the metallic salt which is dissolved in the water. As I said before, if any metallic potassium or sodium should deposit it will be immediately dissolved in this water formed by the decomposition of the metallic salt. As a matter of fact, metallic sodium or potassium is kept in bottles of benzine or kerosene to protect it against the moisture in the air with which it combines readily. When in contact with water these metals decompose water, giving off one volume of hydrogen and forming an hydroxide of sodium or potassium as the case may be.

As to the amount of hydrogen set free in a solution, this, of course, depends upon the current. The more current passing through a solution the more water will be decomposed and the more violent the ebullition of gas.

It seems to me to be a duty of every member of this Society to point out wherever possible any mistakes or false conclusions promulgated in any article or paper which may come to their attention. It is the unquestioned acceptance of alleged facts and the guessing at facts which cause all the mystery and doubt and error that usually follow in the wake of such acceptance of false conclusions and theories which are not backed up by sufficient proof of their own correctness. It is, therefore, in this spirit and not in a spirit of criticism that I have endeavored to point out the danger in following out the lines of reasoning laid down by the author of this article under discussion.

I hold to the theory of porous castings as the reason for "spotting out" because that is the only satisfactory reason that has yet been advanced to account for this troublesome phenomenon.

Another thing which to my mind is very important and worth while pointing out is the use among a large number of experienced platers of old recipes for solutions which upon examination have nothing to commend them. A good many of them are nothing but a jumble of various chemicals which in many cases have nothing in common with one another to justify their use. Then when anything goes wrong with a solution they merely complicate matters and add to the difficulties of a hard job. All platers should realize that copper, brass or bronze can be deposited more easily out of the very simplest kind of a solution than one containing all kinds of strange chemicals. When such a simple plating solution gives trouble the plater has only a few things to contend with and in a short time he can remedy the wrong condition because it will be self-evident in some familiar manifestation of the particular ailment which is causing all his trouble.

Until we are given a better and more scientific reason for "spotting out," I feel that we ought to follow the present theory, because it holds proof within itself that it is the correct theory. There have been many investigators in the past who have advanced theories on various topics and phenomena who later

on have been discredited because they could produce a comprehensive record of their investigations or because their conclusions were not based upon facts, or their methods and statements were too indefinite. This sort of investigation never gets anyone anywhere; it is mere guesswork and one can never be sure of the results of experimentation unless all phenomena are observed and recorded and a complete, comprehensive and intelligent record of all proceedings is made. This body has been organized for the express purpose of education, among other things. Surely then, if something pertaining to our activities is advanced as a matter of so and so many facts, ought we to accept it without examination? If we do we shall be misinformed and misled many times, and instead of learning anything we will be more confused than ever we were. Therefore, I trust that all who read this will "get the point," and if I have spoken plainly, I trust that I have spoken truthfully.

VIEWS ON THE SPOTTING OUT PROBLEM

By E. S. Thompson, Chicago Branch

In looking over the expressions of the different authors in giving their opinions as to the causes of the spotting out of plated work, when plated in cyanide solutions, they nearly all agree that this troublesome feature is caused by cyanide entering the pores of the metal and remaining there until after the work is finished, when it is forced to the surface by expansion and contraction of the metal. All, except one—Mr. Louis Schulte of Chicago—seem to agree that the cyanide alone is responsible for the "freckles" seen on brass and bronze and copper plated articles.

I must disagree with all except Mr. Schulte. In making up new solutions, using about 4 ozs. excess cyanide of potassium to each gallon of a cyanide solution with a metallic content of 2 oz. and using a high current density (about 75 watts to the square foot of surface to be plated), (now some fellow will say that the deposit would blister). I noticed that very few, if any, spots appeared on cast-iron which had been brass plated. After working the solution for several weeks without making any additions, the "freckles" began to appear and became so large and so numerous as to completely ruin my work. At that time I could not intelligently study out my troubles and the remedy, and I took from a trade journal what I supposed was the correct solution of it, which was to the effect that hydrocyanic acid had entered the pores of the metal. I immediately added more metal to the solution, although the hydrometer showed a gain of nearly 2 degrees in density. But somewhere I had read something about a hydrometer not being a true criterion of the metallic content of a solution, and I went at it blindly. The result

of adding more metal to this solution was to neutralize what remained of the free cyanide, and the deposit was very slowly formed and off color. I could not get enough current through to evolve very much gas on the cathode; but as we were in a hurry for the work and were working on orders for sets, the deep-yellow color desired could be ignored, provided the sets were uniform in color. I plated up a lot of work by taking out my anodes and cleaning them every hour or so, and put it out to the buffer. It was buffed out nicely and placed on the bench to be lacquered. After the lapse of several hours I instructed the lacquerer to lacquer up this work. He called me into the lacquer room and showed it to me, and what was my amazement to find that insetad of curing the spots, I had increased them. I lost no time in dissolving some cyanide and pouring it into that solution. I need not go into the trouble that followed by working such a rich solution. I will say only that I got it to working right only after throwing about half of it away and diluting with water. Strange to say that I had no more spots.

The above incident caused me to make a few experiments that I might determine the cause of spotting out. At no time in these experiments did I experience any trouble with freshly prepared solutions containing a high content of free cyanide. The most troublesome solutions were those to which I added ammonia, carbonate of soda, caustic soda, carbonate of potash and caustic potash, and bisulphate of soda. The spotting out from these solutions was readily stopped by the addition of more cyanide. I then decided that the spotting out was not caused by too much cyanide in solution, but rather by not having enough.

It is only in recent years that I have been able to give a logical explanation of the phenomena of spotting out and, like Mr. Schulte, I do not believe that it is caused by the cyanide alone.

In the electrolysis of a cyanide solution, cyanogen is evolved at the positive electrode instead of the negative, as most platers imagine. It is true that decomposition of the molecules of cyanogen, potassium, metal and water takes place at the negative electrode, the cyanide of potassium being set free by surrendering its metal to the electrode. Hydrocyanic acid, in my opinion, does not escape into the atmosphere under this condition, as cyanogen and hydrogen do not combine directly, it being necessary to employ an acid in the combining of cyanogen and hydrogen. It follows then, that with a normal solution containing cyanide enough to keep the solution in a state of high conductivity, the molecules are broken up quite rapidly, an abundance of hydrogen and other elements are set free and the hydrogen serves to throw off any salts of potash or soda, which might have a tendency to enter the pores of the metal. We all know that with a solution too weak in metal, the evolution of hydrogen is so strong around the pores that there is considerable

surface around the pore and a streak above it that is not covered with the deposit. I do not believe that any plater has had any trouble with spotting out when his work was coming from the solution of that condition. But the majority of us, in seeking to remedy the streaks would over do it and leave too little free cyanide, thus rendering the solution incapable of rapid decomposition, and spots would again appear.

It will be seen that if I am correct in the statements above, that the hydrogen forming and escaping prevents the entrance of any salts into the pores. The salts may or may not be combined with cyanogen. Potash alone would cause the brown spots to appear if any of it entered the pores and was exposed to a humid atmosphere afterward. Then there are certain lacquers which, when combined with the salts of potassium or sodium, set up an action on the metal which reduces it to an oxide.

In the case of ammonia being added to the solution, cyanate of ammonia will eventually be formed, and if very much ammonia is added, the anodes will be coated over with a scum to such an extent that free action of the current is impossible, and then the cyanates enter the pores, causing spots to appear.

I will not attempt to give a formula for cyanide solutions. I cannot use the same formula in two different plants, so far as metallic conetnt is concerned. But if anyone will heed the advice of a man who has had a wide range of experience in handling cyanide solutions, I would say: Do not add potash and soda to cyanide solutions. Instead of using carbonates to make up the solutions, use metallic cyanides and ignore the formulas given by the various authors, using anywhere from 1 oz. of metal to the gallon to 2 ozs., as best suits your class of work. Do not use more than 6½ volts from the dynamo when plating brass and bronze. Much less than that will give better results if the solution is proportioned so that it will give a free deposit. Do not add ammonia as a brightener, nor sodium arsenate. Use arsenic dissolved in cyanide.

We do not need to add conductors to cyanide baths. The sodium contained in the cyanide answers the purpose as well as increasing the density of the solution by adding metal with the correct proportion of cyanide.

Would it not be a good plan for some of our members who have their laboratories to conduct some experiments with cyanide solutions, neutralizing the sodium or potassium salts formed in the solutions by adding cyanogen instead of the potassium or sodium cyanides? The gas may be had by heating cyanides to redness in retorts and conducted into the solutions by tubes.

I believe that this would be be the ideal way of neutralizing the carbonates in the solution.

Or we could precipitate the carbonates by cyanide of barium.

COMMENT AND CRITICISM

In the October Review appeared a very important communication by Mr. Walter T. Donnelly. I shall not enter into a discussion of the merits or demerits of a foreman polisher taking the "job" of a foreman plater. There is only one of two conclusions to arrive at from each state of affairs, namely:

Either the employer is retiring from business or is deliberately committing financial suicide by each procedure, which is hardly possible but probable, or the foreman polisher is more competent than the foreman plater, and therefore economy to combine the two departments under one head, under the most competent man.

A practical plater does not necessarily mean a competent foreman. A knowledge of handling men of executive ability is as important, if not more, than a knowledge of good plating. A man may be a good plater, a good executive, and yet prove unsatisfactory to his employer. He may be wasteful, careless of his employers interests, his personality, his attitude, his behavior and general disposition and conduct towards his help and superiors, is perhaps obnoxious, distasteful, and objectionable. Said to me once a large employer of labor, when called on for consultation regarding the plating department: "The plating is satisfactory. We believe our plating is equal to the best. Mr. —— is not a drinking man, thoroughly honest and conscientious, and yet I hate to come in contact with him. I am tired and sick of his constant tales of woe and disagreements and petty differences with other employees of the shop, and have determined to make a change."

I hope my feeble efforts in commenting and answering questions have proven beneficial and helpful. Now I want to ask a question myself and I hope every member will reply and send his answer for the Review.

This man was thoroughly competent, honest and sober, and yet he lacked a quality that unfitted him for the position of foreman. What was it?

Whether the employer is wrong, or whether the foreman plater is incompetent is not the issue. Mr. Ter Doest is right: "Our Society is not a union to protect a man to hold his job," neither is our Society formed for the purpose of censuring the methods of an employer. What we are concerned in: Have we a right to accept for membership others than foreman platers of recognized ability? Would the shoemakers accept for membership a tailor? Would the bricklayers take in plasterers? Would the medical societies accept druggists into their organization? Ours is a Society of practical platers and I was under the impression that foremen of five years were eligible only. Does our constitution and by-laws permit for acceptance any

Tom, Dick and Harry, "scrub brushes," and the like to full membership?

A card in our Society should not only be an evidence of membership, but should be proof of competence, and only by such conduct can we hope to hold and retain the respect and confidence of employers of platers.

In this month's issue I intended commenting on Mr. Baum's article, "Slime in Nickel Solutions." I consider the subject of the utmost importance to determine once for all whether this slime, which is for the most part sulphate of iron, is or is not necessary to good nickeling. After giving the matter considerable thought, and in view of the fact that Mr. C. H. Procter, who is recognized as an authority on all classes of plating, only recently advised to hang in the nickel solution over night steel plates for the removal of hydrogen which caused pitting. Wishing to be friendly, "cautions yet brave," which means to delve deeper into its mysteries and make personal experiments, and as soon as I shall have accomplished my object Iwill make it known.

Realizing the difficult task I humbly ask your "prayers," which also means that whoever has any information or light on the subject, won't you kindly communicate it to me. My address is 2019 Park Ave., Richmond, Va.

JOSEPH WALTERS.

Mr. Jos. Walters,
Richmond, Va.

Dear Sir:

Mr. Harding handed me your letter at our last meeting, asking for an opinion on "Red Slime" in a nickel plating solution as to whether it is or is not a benefit for deposition. My opinion is that it does not benefit the process of plating in any way. Just as good results can be obtained from a solution when the sediment has been removed as one containing it. It may, however, be necessary to add some single salts to insure good results after the sediment has been removed due to the fact that the solution has become a trifle weakened during the filtering process, and the space occupied by the sediment and that which is absorbed by the filter papers invariably has to be replaced with water, tending to weaken the solution. If nickel solutions were allowd to run year after year without filtering, the sediment would eventually rise to a height where the work to be plated would be partially submerged, causing trouble in the plating. At this point it is absolutely necessary to remove whole or part of it. If, as suggested in the "October Review," sufficient sulphuric acid or some of its bases (I have never heard of any of the latter that would bring the residue back into solution) be added to redissolve any precipitate that forms, the solution would then be too acid for good results. The dissolved residue,

to be sure, would take up some of the acid, but considerable excess must be kept in the solution to continue redissolving any formation that appears. This would cause much evolution of hydrogen at the cathode, thereby endangering the work. Another objection to having an excess of sulphuric acid in a nickel solution is that it redissolves the whole sediment, impurities and all. The iron found in the residue is just as easily soluble in dilute sulphuric acid as the nickel, and the solution would gradually become loaded with iron. The claim that a nickel solution which has no red bottom or slime in it, does not work well, is wrong. A freshly prepared solution surely works well, and that has no residue.

Nickel solutions that have been relieved of the sediment have always given excellent results, either before or after adding a small quantity of single salts.

Trusting this may be of some assistance to you, and hoping to be of future service, I am,

Respectfully yours,
FRANK P. KOLB.

Mr. Joseph Walters,
Richmond, Va.

Dear Sir:

Your esteemed favor, under date of December 13th, to hand and contents carefully noted. I am heartily in favor of discussing the papers that appear in our Monthly Review, but do not know if Mr. Baum feels that way about it, and as the Review now has its troubles getting enough material, it would probably be better not to commit on anything. The writer does not invite discussion. Mr. Baum's article has much food for thought in it and it has received a great deal from me since I read it. I am at a loss to say much about such matters and would rather not say anything about it unless we thoroughly undertand it ourselves. Of course, some things I know to be wrong, but on the whole he might be an advanced thinker and we not be able to grasp his meaning at once.

I have felt the pangs of unjust criticism myself some five years ago from the then editor of the Quarterly Review, and while I did not like it at that time, because he was as wrong as he could be, still, it did me a whole lot of good by sharpening my wits, and I am ready to say that anything I may write is open for discussion or comment. On the other hand I would call your attention to an article in the same issue by Walter Donnelly, Chicago Branch, who invites discussion, and while I think as he does about being careful about who we admit to membership, this Society is not a union to help a man hold his job, and furthermore, in manufacturing establishments economic conditions are the paramount issue to success. I think a foreman plater that can be dispensed with, as he states in his article, without

anyone to take his place, does not know anything or the firm would soon find out their mistake by letting him go. He had better study up a bit and do better at his next job.

Respectfully yours,

J. H. TER DOEST.

Mr. Joseph Walters,
Richmond, Va.

Dear Sir:

Replying to your letter of the 13th inst., as to whether the slime or settling in the bottom of the nickel tank has a beneficial effect or the reverse, we can only give you the benefit of our experience and result of experiments which we have made. This slime or settling is partially precipitated from the salts, some from the anodes and a good deal from the air and the work. By that we mean that the dust and dirt in the plating room settles on the tank and will, if heavy enough, sink.

General experience has been that when the clear solution is filtered from the tank, the slime removed and the solution put back that the resulting deposit is not as satisfactory as before.

If this slime is stirred up by the work or any other cause it has a bad effect on the deposit, but so long as this slime is allowed to settle in the bottom of the tank undisturbed no ill effects on the plating has been noticed.

It is, of course, quite proper to clean out your tanks and remove this slime and put back the solution, but it is usually necessary to tone up the solution by the addition of salts, and it will be several days before the solution gets back to its normal condition.

Very truly yours,

THE HANSON & VAN WINKLE CO.,

R. D. Foster, Treasurer.

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THE HANSON & VAN WINKLE CO.,

R. D. Foster, Treasurer.

WHAT THE BRANCHES ARE DOING

NOTE TO THE SECRETARIES—All correspondence for this department must be in the hands of the editor by the 15th of each month.

SUPREME SOCIETY

Meets first week in June, 1915, at Dayton, Ohio. Secretary, Walter Fraine, 507 Grand Avenue, Dayton, Ohio.

NEW YORK

Meets fourth Friday of each month at Broadway Central Hotel, New York City, 8 P. M. Secretary, Joseph Minges, 148 Schenck Avenue, Brooklyn, N. Y.

The regular monthly meeting was held December 18th. Preparations are well under way for the annual banquet to be held at the Broadway Central Hotel, February 20th. A large attendance is anticipated.

A paper read by Mr. Thomas Brown on the spotting out problem was well received.

TORONTO

Meets fourth Thursday of each month at Occidental Hall, Bathurst and Queen Streets. Secretary, Ernest Coles, 13 Laurier Av., Toronto, Ont.

This branch held its regular monthly meeting on Thursday, December 17th, with President Magill presiding, and a good attendance. As our meeting, per schedule, would fall on Christmas Eve, it was called one week earlier in the month.

After the regular routine of business a very interesting discussion was held on nickel anodes and nickel solutions in general, all members taking part in the discussion, which was enjoyed by all present. Plans were also formulated for holding an open meeting at which the managers, superintendents, etc., of some of the leading plants are to be invited to talk to us on such matters as efficiency.

The class at the Toronto Technical School is proceeding favorably, the members being at present engaged in the analysis of nickel solutions, after having handled the analysis of silver solutions. It is hoped soon to be able to forward papers on these subjects to the "Review," as the methods seem to be an advance on the older ones for accuracy and simplicity.

DAYTON

Meets first and third Wednesday of each month at the Y. M. C. A., Dayton, Ohio. Secretary, Alphonz Lamoureux, 500 East First Street, Dayton, Ohio.

On Wednesday evening, January 6th, Dayton Branch held its regular monthly meeting, which was well attended. After disposing of the regular business the question of holding a banquet in the near future was taken up and it was decided to hold a banquet, and a committee of five was appointed by the

chair to arrange for same. The committee consists of Jos. D. Keyes, Chas. F. Kettering, Walter Fraine, Forrest Hartzell, A. Lamoureux. The committee has already held a meeting and all preliminaries were attended to. Details and arrangements will be given later.

The branch decided to begin in February the actual work of our forthcoming convention, and from the interest manifested it is clearly evident that all those attending will leave here saying "It was the best ever."

The balance of the evening was spent in listening to a very interesting explanation by our president, Mr. Walter Fraine, on the progress made at the N. C. R. Co. in the making and using of high grade purity anodes. (For the benefit of all our members, the N. C. R. Co. make all of their own anodes). Mr. Fraine began by describing the making of an anode testing 99.50% pure, from which they had very good results. Later they experimented with shot nickel anodes, thereby eliminating all alloys contained in the ordinary anode, also doing away with the slime and sediment at the bottom of the tank, also constantly increasing the metallic strength of the solution. One particular solution worked with the shot nickel has been run every day for more than six months with the addition of nothing except water, with the result that at the end of that period the above solution tested 1.4% higher metallic property than an old solution using old anodes with the constant addition of salts. Mr. Fraine's talk was listened to very attentively, and brought out some very good discussions, and at a late hour all went home feeling that they had spent a very profitable evening.

CHICAGO

Meets fourth Saturday of each month, 8 P. M., Western Building, Randolph Street and Michigan Avenue. Secretary, H. E. Willmore, 5911 South Boulevard, Chicago, Ill.

The regular monthly meeting was well attended, December 26th, considering its proximity to the holidays.

The banquet committee made its final report, and after a vote of thanks for the efficient work performed was discharged, Mr. E. Lamoureux being singled out for special honors.

A committee was appointed to confer with the Chicago Board of Education to ascertain what could be done toward receiving instructions in chemistry at one of the technical high schools.

Mr. Harry de Joannis, editor of the "Brass World," was present and entertained the members with some of his famous reminiscences. Mr. Peters of the Milwaukee branch was also a visitor.

Mr. George Burt submitted the following: To those wishing an easy and simple method of transferring solutions, I would recommend a steam jet pump or ejector, costing four or five dollars. With the smallest size pump, which lifts 8 gallons per

minute, I find it very easy to change a solution from one tank to another. I lift the pump up so that the end of the suction pipe is several inches from the bottom of the tank before starting, which leaves the slime on the bottom until the clear solution has been removed. I then lower the pipe to the bottom, and with the aid of a piece of hose turned into the tank, throw the thick sediment into the sewer. The filter I use is a piece of canton flannel stretched over a frame covering the entire top of the tank.

MILWAUKEE

Meets first Friday of each month at Eagles Hall, 137 Second St., Secretary, E. C. Yaeger, 962 Ninth St., Milwaukee, Wis.

At our last meeting, held January 8th, we had a very good attendance and the discussions were, as usual, very enthusiastic. The question of the evening was: How can die castings be plated successfully? The answers were as follows: If die castings were cleansed and given a flash in a cyanide copper solution, then nickel plated, in the course of one or two months the deposit would lift. If given a heavy coat of copper, and nickel plated, it would do the same thing, but if nickel plated with about 4 volts and agitated, it was found that the lifting of the deposit was entirely overcome. It was also stated that, work plated in a copper solution containing a great excess of cyanide and low in metal. The deposit would also lift in course of time. We, therefore, concluded that a cyanide copper solution should be low in cyanide and low in metal and worked at a low current strength.

The cleaning of die castings was next discussed. One member cleaned die castings as follows: First wash the castings in benzine, then scratch brush with a soft, fine wire brush, keeping the article thoroughly wet while handling. Another member uses the electric cleaner with success.

When plating zinc art glass work the solution should be high in both cyanide and metal to prevent spotting out and keep the deposit from turning dark after being taken from the solution.

Question: How can springs be copper plated so that they do not break after being plated? One member suggested that springs should not be pickled, but that they should be put in a tumbling barrell with sawdust and the scale tumbled off. Bichromate of potash can also be used for pickling springs, as it will not cause the formation of hydrogen gas, which is the cause of the trouble. Another member suggested that the springs be baked for about four hours at 120 degrees Fahr., after plating, to eliminate the trouble.

It was decided to hold a banquet on our second anniversary in May, the members being very enthusiastic over the success of the Chicago Branch banquet.

In the September issue of the Review, Milwaukee Branch asked questions and gave answers on nickel solutions that had been discussed by its members, also asking for a discussion of

the subject by other branches. As a rule, most of the questions received some kind of an answer, but in discussing same without being prepared, some of the answers are not satisfactory. We, therefore, asked for co-operation, and from the comments in the December Review, we can readily see the value of co-operation, which is the basic principle of our Society, we, therefore, wish to extend a vote of thanks to Mr. Charles H. Proctor, Prof. Jos. W. Richards, Prof. Oliver P. Watts, Prof. C. W. Bennett, Profs. F. C. Matthers and Barnett W. Cochran, Past Supreme President, Geo. B. Hogaboom and all others who so cheerfully responded. If the secretaries of the various branches of the A. E. S. would send in all the discussions that are taken up at their meetings to the Review, there would be an endless lot of discussion on hand all of the time, and it would give all the branches material to work on.

CLEVELAND

Meets second and last Saturday of each month at Central Y. M. C. A. Secretary, Charles Werft, 331 Strathmore Avenue, Cleveland, Ohio.

At our regular meeting, held January 9th, the following officers were elected: President, W. D. Scott; Vice-President, W. T. Wicks; Secretary-Treasurer, Charles Werft; Librarian, James Purcell; Board of Managers, H. T. Ter Doest, P. Fitzgerald, F. Heckel.

This branch has adopted a resolution that when a member wishes to transfer to another branch, to send his dues for the remainder of the fiscal year on the receipt of a letter from the branch he wishes to join. There is nothing in our by-laws or constitution to warrant us doing so, but as a matter of courtesy to that member and the branch he wishes to join.

Our next meeting will be held Saturday, Jaunary 30th.

ST. LOUIS

Meets fourth Saturday of each month at Public Library Assembly Rooms. Secretary, H. H. Williams, 2134 Nebraska Avenue, St. Louis, Mo.

The banquet of this branch, which will be held January 23rd, has the following program:

Introduction ..... E. J. Musick
Trials and Troubles of a Plater ..... H. J. Richards
Electro Plating and Chemistry ..... Robert Fischer
Nickel Plating and Standardizing ..... F. Rushton
Address ..... Ben Blewett
Electro Coloring of Metals ..... P. Tressider
The American Electro-platers' Society ..... H. H. Williams

MENU
Consomme a la Potash
Oxidize Celery
Pickled Radishes

Electric Cleaned Roast Turkey
Reversed Current Cranberry Sauce
Copper Plated Potatoes
Wire Beans
Barrel Plated Peas
Nickel Plated Crackers
Polished Cheese
Cyanide of Coffee

BUFFALO

Meets first Saturday of each month at the University of Buffalo, 8 P. M. Secretary, John G. Murphy, 71 Dingens Street, Buffalo, N. Y.

The regular meeting was held Saturday, January 9th, on account of the first Saturday being right after New Year's day. The meeting was well attended as usual and proved very interesting to all present.

The class in chemistry have a program arranged and will do considerable work for the balance of the year. This class will now be under the direct supervision of Prof. Childs, as Mr. F. A. Shepherd, who had charge of it for the first term found that it took too much of his time at the expense of some private research work which he is to do in one of the other laboratories. He thanked the class for the gold clock he received at Christmas and advised them of the best way to get the full benefit of the present opportunity.

Mr. Chas. E. Hedrick was elected president for the balance of the term, and will be a good "booster and worker." He said "all he would promise was his best," which is sufficient.

Prof. Childs could not continue his talk at the meeting on "Standardization," as he had to speak at a banquet that night.

The program for the next meeting is "Methods of Extracting Gold from Waste, Rags, etc.," by Mr. J. G. Murphy. "Ormolu Dipping and Dips," by Mr. Wrobeleski. For the following meeting, "Silver Deposits and Methods," by Mr. Back.

There seemed to be a tendencey for all to get to work, and the prospects are good for lively meetings in the future.

NEWARK

Meets first and third Friday of each month, 8 P. M., 47 Bank Street, Newark, N. J. Secretary, Chas. A. Stiehle, 46 West Madison Avenue, Irvington, N. J.

An open meeting was held on January 8th. The meeting was formally opened by Horace H. Smith, president. He said it afforded him great pleasure to welcome so many (75 being present) and hoped that all would feel that the rooms were for their use, and that the evening would prove one of profit to all. Mr. F. A. Rojas gave a practical demonstration of Electro-Chroma. Antique finishes were produced by the electric method very rapidly. A large number of fine greens, browns and blues were exhibited. He also explained his patent rheostat which he

uses inside the bath. He claims that the current should be controlled or regulated instead of the pressure or voltage.

Mr. Chas. H. Proctor was introduced and entertained those present with one of his earnest addresses. Mr. R. H. Sliter was also present and offered his congratulations. This branch will hold a whist, dance and bean bag social Friday evening, January 15th.

CINCINNATI

Meets once each month at Dennison Hotel, Cincinnati, Ohio. Secretary, F. H. Nordman, 720 Froom Ave., Cincinnati, Ohio.

ROCHESTER

Meets second and fourth Friday of each month at University of Rochester. Secretary, C. V. Haring, 603 Dewey Avenue, Rochester, N. Y.

DETROIT

Meets first Friday of each month at Prismatic Hall, 140 1st Street. Secretary, B. E. Miller, 545 Townsend Avenue, Detroit, Mich.

PHILADELPHIA

Meets first Friday of each month in the Harrison Laboratory Building, University of Penna., 34th and Spruce Streets, Philadelphia, Pa. Secretary, Philip Uhl, 2432 North Twenty-ninth Street, Philadelphia, Pa.

BRIDGEPORT

Meets third Friday of each month at the office of the Brass World, 260 John Street, Bridgeport, Conn. Secretary, Nelson Barnard, 858 Howard Ave., Bridgeport, Conn.

ELECTED TO MEMBERSHIP

Chicago—
Sam Berman ..... 905 Sacramento Blvd., Chicago, Ill.

Bridgeport—
H. B. Rathbun ..... 44 Holmes Ave., Waterbury, Conn.

Cleveland—
E. W. Hale ..... 47 Market St., Akron, Ohio
Daniel Wren ..... 1383 E. 90th St., Cleveland, Ohio
Tehern Wadsworth ..... Gray Apartments, Elyria, Ohio
William T. Wicks ..... 1303 Oregon St., Cleveland, Ohio
F. C. Heckel ..... 7511 Lawn Ave., Cleveland, Ohio
William D. Scott ..... 3707 Fulton Road, Cleveland, Ohio
James Purcell ..... 2171 Japan Ave., Cleveland, Ohio
Harry Ochs ..... 1837 W. 47th St., Cleveland, Ohio
Patrick Fitzgerald ..... 3915 Spokane St., Cleveland, Ohio
Frank J. Burkhart ..... 2534 E. 30th St., Cleveland, Ohio

APPLICATIONS FOR MEMBERSHIP

Chicago—
Harley M. Burdick ..... 555 S. 26th St., Omaha, Neb.

Bridgeport—
Chas. E. Perkins ..... Maple St., Milford, Conn.
Chas. B. Fiston ..... 551 Myrtle Ave., Bridgeport, Conn.

St. Louis—
Wm. H. Drochelmann ..... Evansville, Ind.

Newark—
Fredk. Gumm ..... 1023 Louisa St., Elizabeth, N. J.

CHANGE OF ADDRESS

Ernest Coles ..... 13 Laurier Ave., Toronto, Ont.
Emil Nordblom ..... 353 Church St., Toronto, Ont.
W. C. Shaffer ..... 1341 Vincennes Ave., Chicago Heights, Ill.
E. S. Thompson ..... 1398 E. 89th St., Cleveland, Ohio
William Voss ..... 2011 Palmetto St., Brooklyn, N. Y.
E. L. Eckenrode ..... 3320 S. 22nd St., Omaha, Neb.
Geo. Hogaboom ..... 561 Stanley St., New Britain, Conn.